

BASIS OF BEARINGS:

MISSOURI STATE PLANE COORDINATE SYSTEM
(NAD) 1983, MISSOURI, WEST ZONE

NOTES:

ALL CONSTRUCTION ON THIS PROJECT SHALL CONFORM TO THE CITY OF LEES SUMMIT TECHNICAL SPECIFICATIONS.

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING UTILITY LOCATIONS PRIOR TO EXCAVATION.

SCHLAGEL

ENGINEERS PLANNERS SURVEYORS LANDSCAPE ARCHITECTS

14920 West 107th Street • Lenexa, Kansas 66215
(913) 492-5158 • Fax: (913) 492-8400
WWW.SCHLAGELASSOCIATES.COM
Missouri State Certificate of Authority
#E2002003600-F #LAC2001005237 #LS2002008659-F

PREPARED BY:

STATE OF MISSOURI

JAMES L. LONG

NUMBER PE-2014010495

PROFESSIONAL ENGINEER

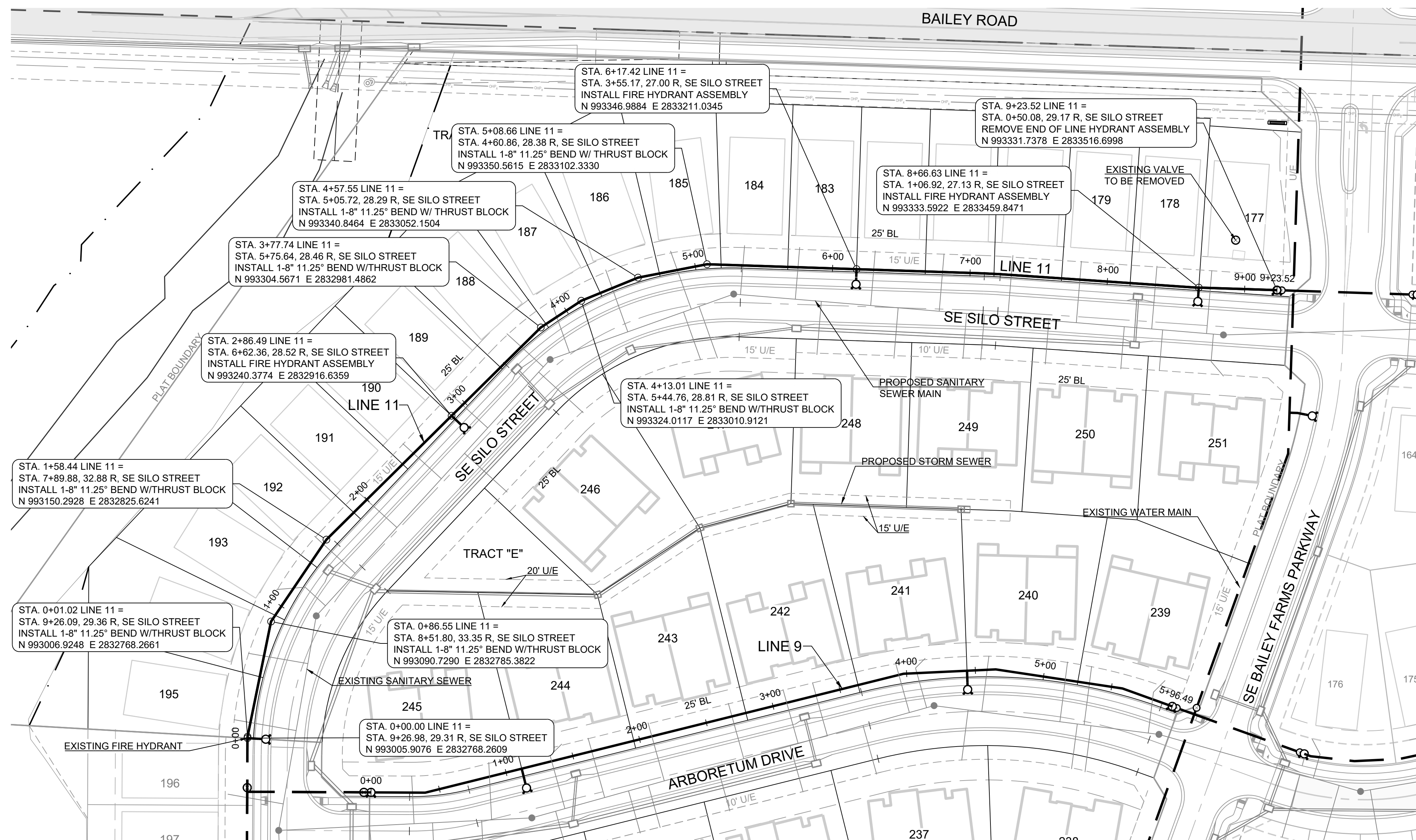
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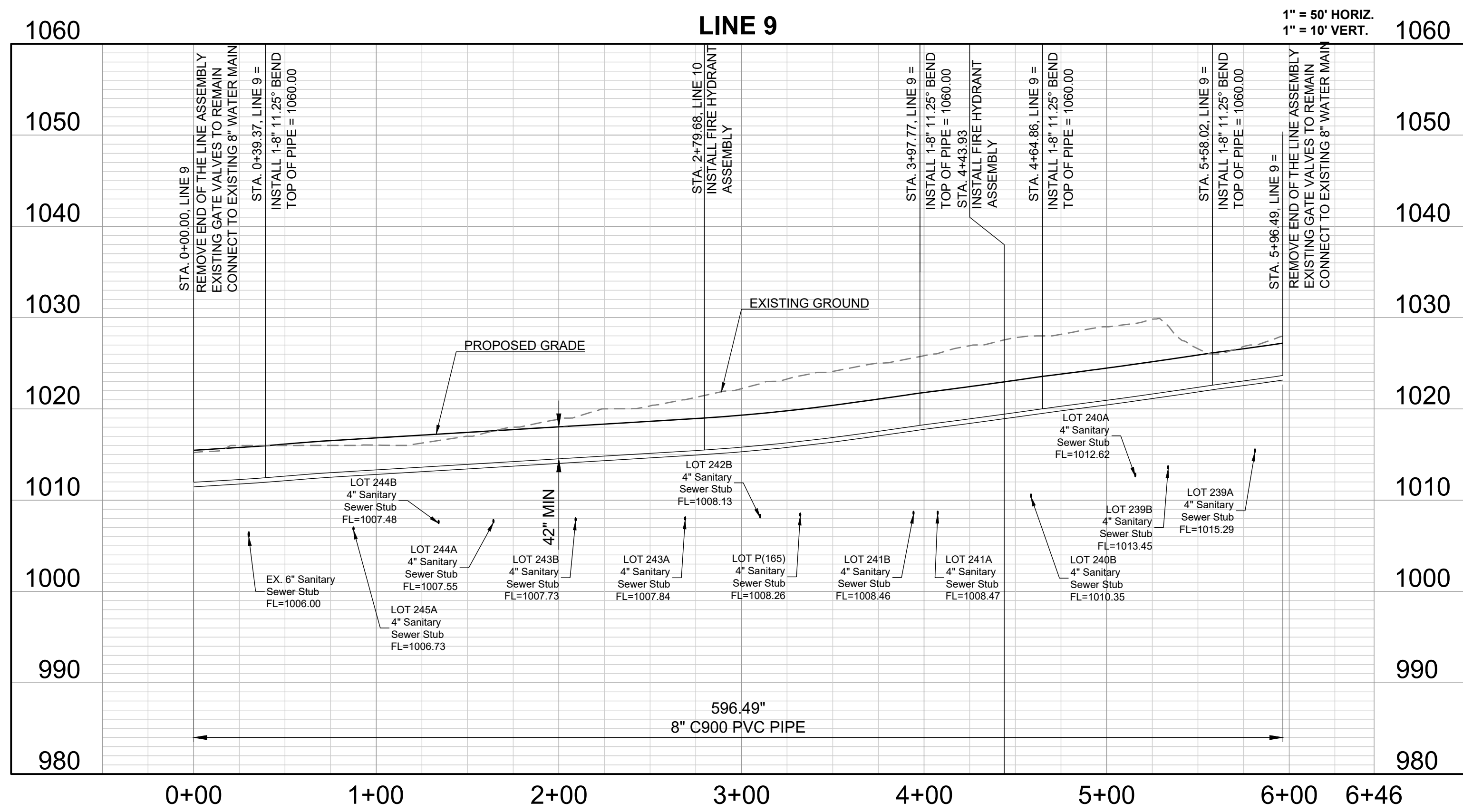
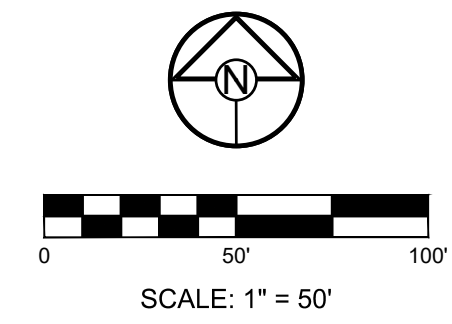
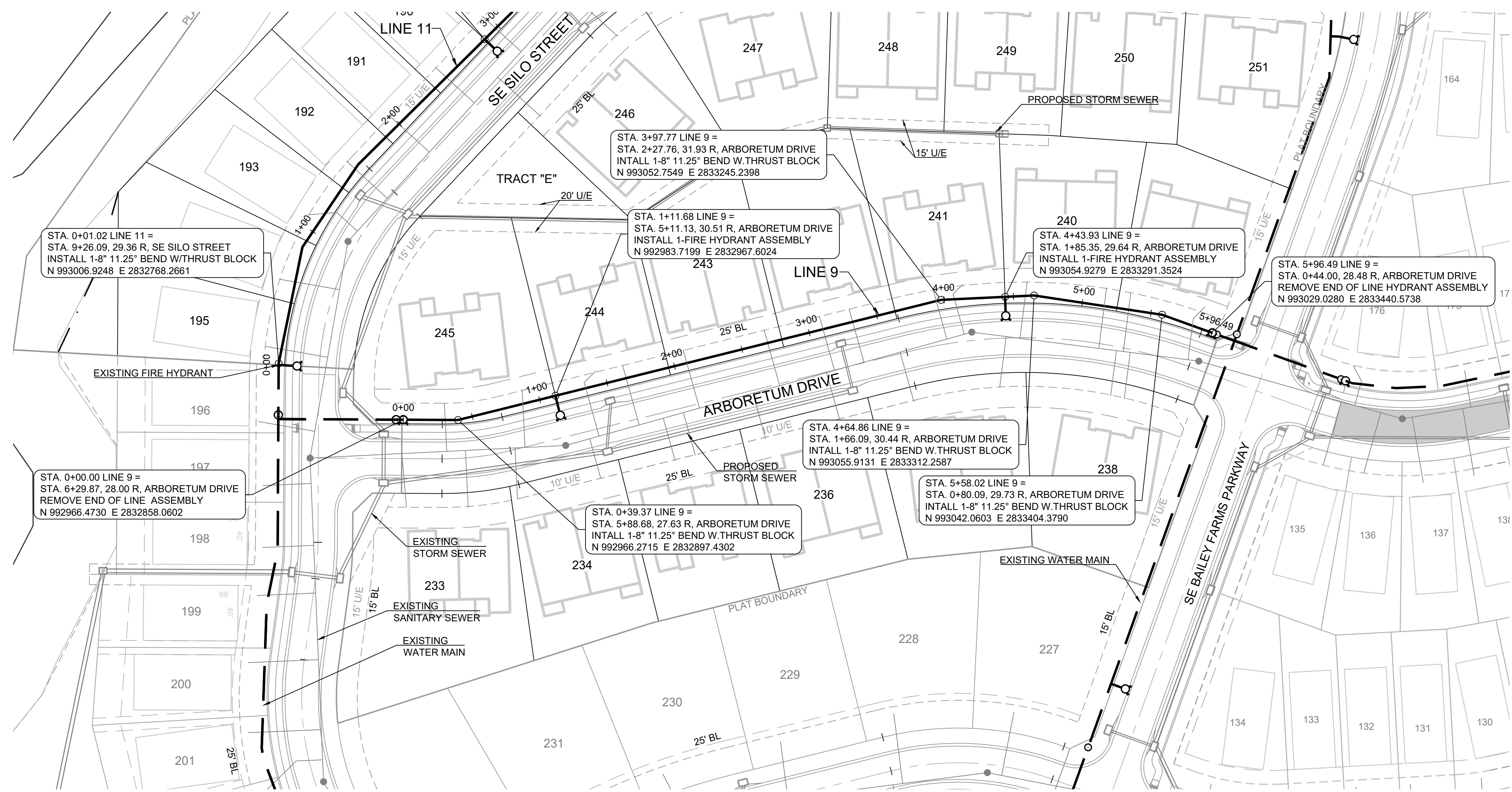
SCHLAGEL & ASSOCIATES, P.A.

CORNERSTONE AT BAILEY FARMS, 2ND PLAT
WATER MAIN PLANS

SE BAILEY FARMS PKWY & SE ARBORETUM
DR LEE'S SUMMIT, MO

REVISION DATE	DESCRIPTION	CITY COMMENTS
08/01/2025	1	
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MISSOURI GEOGRAPHIC REFERENCE SYSTEM BENCHMARK:

BM JA-45, IS A KC METRO ALUMINUM GRS DISK SET IN CONCRETE AND ABOUT 3 INCHES BELOW THE PAVEMENT ON THE SHOULDER OF SE RANSON ROAD. IT IS STAMPED JA45, 1987.

ELEV. = 1046.25

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#E2002003609-F #LAC2001005237 #LS200200859-F

PREPARED BY:

SCHLAGEL & ASSOCIATES, P.A.

CORNERSTONE AT BAILEY FARMS, 2ND PLAT
WATER MAIN PLANS

SE BAILEY FARMS PKWY & SE ARBORETUM
DR LEE'S SUMMIT, MO

REVISION DATE	DESCRIPTION
08/01/2025	CITY COMMENTS
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08/01/2025	CITY COMMENTS
08/01/2025	CITY COMMENTS
08/01/2025	CITY COMMENTS

DRAWN BY:	NCA
CHECKED BY:	JLL
DATE PREPARED:	
PROJ. NUMBER:	25-041

LINE 9 PLAN & PROFILE

2" FROM BACK OF CURB

BACK OF CURB

GROUND SURFACE

MECHANICAL JOINT (TYP.)

THRUST BLOCK (SEE NOTE 1)

KEEP WEEP HOLE FREE OF CONCRETE AND FOREIGN MATERIAL

24"X24"X4" SOLID CONCRETE PAD

UNDISTURBED EARTH

PROVIDE MIN. 1/2 CU. YD. OF 3/4" GRANULAR FILL PER AWWA C600 SEC. 4.2.7.2.4

MJ RESTRAINT FITTINGS (SEE NOTES 1 & 2)

THRUST BLOCK

UNDISTURBED EARTH

6" GATE VALVE

VALVE BOX & BASE

VARIES

20" MIN. 42" MAX.

NOTES:

1. WHEN RETAINER GLANDS ARE USED IN LIEU OF MECHANICAL JOINT (MJ) RESTRAINT FITTINGS, HORIZONTAL THRUST BLOCKS ARE REQUIRED.
2. GATE VALVE MAY BE BOLTED DIRECTLY TO MJ RESTRAINT TEE.
3. SEE APPROVED PRODUCTS LIST FOR WATER UTILITIES FOR FIRE HYDRANT, VALVES, VALVE BOX LID, AND COVER.
4. BOTTOM HYDRANT FLANGE SHALL BE 2" TO 6" ABOVE FINISHED GRADE.
5. FOR STREETS WITHOUT CURBS FIRE HYDRANTS SHALL BE PLACED WITHIN 1 FOOT OF THE R/W LINE, BUT NOT MORE THAN 10" FROM EDGE OF PAVEMENT. FIRE HYDRANT SHALL NOT BE PLACED IN BOTTOM OF DITCH.
6. HYDRANT SHALL BE ROTATED AS DIRECTED BY INSPECTOR.

LS

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

HYDRANT - STRAIGHT SET

Date: 01/2016
Drawn By: JN
Checked By: DL

WAT-7

REQUIRED CONCRETE BEARING AREA (SQUARE FEET - SF)

NOM. DIA. (INCHES)	180 TEE, PLUG	90 BEND	45 BEND	22.5 BEND	11.25 BEND
6	4.7	6.7	4.0	4.0	4.0
8	8.4	11.8	6.4	4.0	4.0
10	13.1	18.5	10.0	5.1	4.0
12	18.8	26.7	14.4	7.4	4.0
14	25.7	36.3	19.6	10.0	5.0
16	33.5	47.4	25.6	13.1	6.6
18	42.4	REST. JT.	32.5	16.5	8.3
20	REST. JT.	REST. JT.	40.1	20.4	10.3
24	REST. JT.	REST. JT.	REST. JT.	29.4	14.8

POURED CONCRETE BLOCKS (TYP.)

UNDISTURBED EARTH

BEARING AREA (TYP.)

BOND BREAKER (TYP. ALL BLOCKS)

1/2 DIAMETER

SECTION A

1/4" BOND BREAKER

NOTES:

1. ALL BENDS WITHOUT RESTRAINED JOINTS SHALL HAVE CONCRETE THRUST BLOCKS INSTALLED FOR RESTRAINT.
2. MEGA LUGS MAY BE USED ONLY IN CONJUNCTION WITH CONCRETE THRUST BLOCKING.
3. BEARING AREA MUST BE AGAINST UNDISTURBED SOIL.
4. DO NOT COVER JOINTS OR BOLTS (WHERE APPLICABLE) WITH CONCRETE.

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HORIZONTAL THRUST BLOCK

Date: 01/2016
Drawn By: JN
Checked By: DL

WAT-1

REQUIRED CONCRETE VOLUME (CUBIC FEET - CF)

NOM. DIA. (INCHES)	180 TEE, PLUG	90 BEND	45 BEND	22.5 BEND	11.25 BEND
6	50.5	71.4	38.6	19.7	9.9
8	89.8	126.9	68.7	35.0	17.6
10	140.2	198.3	107.3	54.7	27.5
12	202.0	REST. JT.	154.6	78.8	39.6
14	REST. JT.	REST. JT.	210.4	107.3	53.9
16	REST. JT.	REST. JT.	REST. JT.	140.1	70.4
18	REST. JT.	REST. JT.	REST. JT.	177.3	89.1
20	REST. JT.	REST. JT.	REST. JT.	REST. JT.	110.0
24	REST. JT.	REST. JT.	REST. JT.	REST. JT.	158.4

#4 EPOXY COATED GR. 60 REBAR WITH 6" HOOK & MIN. CONCRETE EMBEDMENT DEPTH

UNDISTURBED EARTH

NOTES:

1. ALL BENDS WITHOUT RESTRAINED JOINTS SHALL HAVE CONCRETE THRUST BLOCKS INSTALLED FOR RESTRAINT.
2. MEGA LUGS MAY BE USED ONLY IN CONJUNCTION WITH CONCRETE THRUST BLOCKING.
3. BEARING MUST BE AGAINST UNDISTURBED SOIL.
4. DO NOT COVER JOINTS OR BOLTS (WHERE APPLICABLE) WITH CONCRETE.

LS

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

VERTICAL THRUST BLOCK

Date: WAT-2
Drawn By: JN
Checked By: DL

WAT-2

24" MIN.

24" MIN. TO EQUAL TO TRENCH WIDTH

5" MIN.

TRENCH WIDTH

3" CLEAR

MJ VALVE

MJ RESTRAINT GLAND

POUR CONCRETE AGAINST UNDISTURBED EARTH

TOP VIEW

SECTION A-A

WATER MAIN

#4 @ 12" O.C. EACH WAY EACH FACE

POUR CONCRETE AGAINST UNDISTURBED EARTH

PIPE SIZE	"D" MIN.
6"	4"
8"	7"
12"	15"

NOTE:

THIS DETAIL NOT TO BE USED FOR PIPE GREATER THAN 12"

LS

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MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

STRADDLE BLOCK

Date: 01/2016
Drawn By: JN
Checked By: DL

WAT-3

FINAL BACKFILL (SHALL MATCH INITIAL BACKFILL MATERIAL IN PAVED AND TRACK AREAS)

MIN. COVER TO RIGID PAVEMENT, H

12"

SPRINGLINE

4" FOR 12"-24" PIPE
6" FOR 30"-60" PIPE

MIN. TRENCH WIDTH PER TABLE

INITIAL BACKFILL

HAUNCH

BEDDING

SUITABLE FOUNDATION

MIN. COVER TO FLEXIBLE PAVEMENT, H

RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4"	21"
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
42"	72"
48"	80"
54"	88"
60"	96"

MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS

PIPE DIAM.	H-25	HEAVY CONSTRUCTION (75T AXLE LOAD) *
12" - 48"	12"	48"
54" - 60"	24"	60"

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER

NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION
2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER, AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-900mm).
5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

VALVE COVER

FINAL GRADE

CUT A NOTCH IN TOP OF VALVE BOX AND PLACE 2" OF TRACER WIRE COILED INSIDE VALVE COVER BOX

STANDARD 2" SQUARE VALVE OPERATING NUT

WELD (TYP. 8 PLACES)

ALIGNMENT WASHER 1/8" MIN. STEEL 4-1/2"

1"Ø COLD ROLLED STEEL

MIN. 5"Ø FERROUS METAL VALVE BOX

SOCKET FROM 1/4" STEEL INSIDE DIMENSIONS 2-3/16" X 3" DEEP DO NOT TIGHTEN SET SCREW TO 2" OPERATING NUT

INSTALL TRACER WIRE ALONG OUTSIDE SURFACE OF VALVE BOX

LS

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MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

VALVE STEM EXTENSION AND VALVE BOX

Date: 01/2016
Drawn By: JN
Checked By: DL

WAT-9

VALVE COVER

FINAL GRADE

CUT A NOTCH IN TOP OF VALVE BOX AND PLACE 2" OF TRACER WIRE COILED INSIDE VALVE COVER BOX

STANDARD 2" SQUARE VALVE OPERATING NUT

WELD (TYP. 8 PLACES)

ALIGNMENT WASHER 1/8" MIN. STEEL 4-1/2"

1"Ø COLD ROLLED STEEL

MIN. 5"Ø FERROUS METAL VALVE BOX

SOCKET FROM 1/4" STEEL INSIDE DIMENSIONS 2-3/16" X 3" DEEP DO NOT TIGHTEN SET SCREW TO 2" OPERATING NUT

INSTALL TRACER WIRE ALONG OUTSIDE SURFACE OF VALVE BOX

NOTES:

1. WHEN RETAINER GLANDS ARE USED IN LIEU OF MECHANICAL JOINT (MJ) RESTRAINT FITTINGS, HORIZONTAL THRUST BLOCKS ARE REQUIRED.
2. GATE VALVE MAY BE BOLTED DIRECTLY TO MJ RESTRAINT TEE.
3. SEE APPROVED PRODUCTS LIST FOR WATER UTILITIES FOR FIRE HYDRANT, VALVES, VALVE BOX LID, AND COVER.
4. BOTTOM HYDRANT FLANGE SHALL BE 2" TO 6" ABOVE FINISHED GRADE.
5. FOR STREETS WITHOUT CURBS FIRE HYDRANTS SHALL BE PLACED WITHIN 1 FOOT OF THE R/W LINE, BUT NOT MORE THAN 10" FROM EDGE OF PAVEMENT. FIRE HYDRANT SHALL NOT BE PLACED IN BOTTOM OF DITCH.
6. HYDRANT SHALL BE ROTATED AS DIRECTED BY INSPECTOR.

LS

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

HYDRANT WITH 90 DEGREE BEND

Date: 01/2016
Drawn By: JN
Checked By: DL

WAT-8

SCHLAGEL
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CORNERSTONE AT BAILEY FARMS, 2ND PLAT
WATER MAIN PLANS
SE BAILEY FARMS PKWY & SE ARBORETUM
DR LEE'S SUMMIT, MO

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DRAWN BY: NCA
CHECKED BY: JLL
DATE PREPARED: JLL
PROJ. NUMBER: 25-041

WATER LINE DETAILS

SHEET
5